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ABSTRACT

This paper presents a formative evaluation report, representing the accumulation of evaluation reports and materials from the first year of the New York Collaborative for Excellence in Teacher Preparation (NYCETP) cooperative workshop efforts. The goal of the collaborative is to produce well-qualified teachers of science and mathematics for New York City schools and to increase the number of individuals who enter and successfully complete teacher preparation requirements in science and mathematics. The year 1 report (October 1996) has three sections that include an overall summary, a summary of goals attained, and suggestions for future efforts of NYCETP members. The summary sections reflect participant observations by two evaluators and workshop participant feedback from four faculty workshops and two larger conferences held by cooperating institutions. The year 2 report (March 1997) focuses on the two areas of evaluation activities in progress: (1) formative, ongoing evaluation information to assist in project monitoring and provide technical assistance and (2) summative project documentation and impact indicators. Two appendixes present NYCETP categories of activities on individual campuses cross-referenced with applicable contact groups and an NYCETP case study outline. (SM)

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Formative Evaluation Report
New York Collaborative for Excellence in Teacher Preparation: Years One and Two

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Year One Report -- October 1996

This document represents the accumulation of evaluation reports and materials from the first year of the New York Collaborative for Excellence in Teacher Preparation (NYCETP or "the Collaborative") cooperative workshop efforts. There are three sections, which provide an overall summary, a summary of goals attained, and suggestions for future efforts of the collaborative members. These summary sections reflect participant observations by two evaluators and workshop participant feedback from the four faculty workshops and two conferences held by the cooperating institutions. This is based largely upon detailed summaries and formative evaluation of the individual faculty workshops and conferences that were provided to the project principal investigators.

A. Executive Summary.

This formative evaluation report of the NYCETP is based on four faculty workshops and two larger conferences held during the first year of the Collaborative (1995-1996). These activities are important to the achievement of the objectives of the Collaborative because they represent concrete situations that bring faculty from various campuses together in a formal workshop or conference setting. The meetings provide an opportunity for each college or university associated with the Collaborative to present the activities taking place on their campus and thus serves as a means for disseminating information related to project progress and campus activities. They also facilitate the formation of informal "working groups" by providing the opportunity for individuals from the different campuses to interact. This networking took place during formal workshop sessions, as well as through less structured times such as informal lunches. For example, at the New York University conference seating for lunch was designated such that each individual at a table came from a different institution.

The workshops and conferences also provided evidence of meeting many of the Collaborative's year one goals which are summarized below. Overall, the goal of the Collaborative is to produce "well-qualified teachers of science and mathematics for New York City schools and to increase the number of individuals who enter and successfully complete teacher preparation requirements in science and mathematics" (NYCETP Proposal, p. 9). The Collaborative efforts to meet this main objective may be presented in six clusters of activities: (1) Rethinking college instruction: Methodology and structures; (2) Developing new courses and programs; (3) Developing new curriculum materials; (4) Providing student support and career development; (5) Recruiting promising students into teaching; and (6) Developing exemplary field sites for student teachers. In addition, the initial efforts of the collaborative point toward areas for future activities. These will be

summarized in the third section of this document, Summary of Suggestions and Comments.

This formative evaluation does not provide a comprehensive overview of the collaborative activities. In addition to workshops and conferences, Principal Investigator's, Advisory Committee and Executive Committee meetings have been held on a frequent basis, and case studies of selected courses that are targeted for revision on each campus have been written. These descriptive analyses are in the process of being reviewed, and a preliminary report has been submitted to the Principal Investigator. Post-revision case studies are being planned following year two of the collaborative and will be analyzed in subsequent evaluation reports. Finally, several efforts have begun to collect quantitative data reflecting the impact of the Collaborative and its activities. Both academic achievement and attitudinal data are being collected. This data will complement the descriptive information presented here and in the case studies.

B. Summary of Goals Attained.

The Formative Evaluation Reports for the workshops and conferences held during year one of the NYCETP provide concrete evidence of the efforts of the Collaborative to attain its goals and objectives. The project objectives as presented in the NYCETP Proposal include the following:

1. For Teacher preparation students:

   (a) To significantly improve the mastery of science and mathematics topics and processes by those preparing to be teachers and by new teachers;

   (b) To develop the teaching skills of teacher preparation students and new teachers, particularly those related to the use of technology, hands-on learning, and assessment;

   (c) To promote positive attitudes concerning the ability of all children to learn science and mathematics to a high level;

   (d) To increase new teachers' self-confidence in their understanding of science and mathematics and in their ability to teach these subjects very effectively; and

   (e) To increase the numbers of students who are recruited for teacher preparation courses, successfully complete certification requirements, and are retained in the teaching profession.

2. For the Collaborative Project:

   (a) To promote the development of close, cooperative working relationships between scientists and educators, between higher education and the public schools, and between individual institutions of higher education, including both public and private colleges and universities; and

   (b) To expand and enrich the teacher preparation curricula in science and mathematics and associated opportunities for learning in New York City.

The four workshops and two conferences held during the first year provided ample opportunity for Collaborative members from six different New York City campuses to meet, to engage in discussion, and to share their ideas and concerns. At many of the meetings participants were provided formal and informal forums to converse about common ideas, experiences, issues, and concerns. This may be the most salient outcome of the Collaborative activities during the first year. The faculty workshops and conferences provided the background for the development of networks between faculty members on the different campuses and between these individuals and personnel from outside agencies as well as teachers from the NYC Public Schools.

This summary is structured around the six clusters of collaborative activities stated above which illustrate the accomplishment of specific goals set forth for the Collaborative. This list is not exhaustive, but serves to highlight the accomplishments of the NYCETP members.

1. Rethinking college instruction: Methodology and structures: Many workshop sessions provided examples of innovative ways of thinking about and teaching content area courses to teacher education students. Two workshop sessions in particular, Prof. Fosnot's session at the City College of New York meeting and Profs. Welchman and Kohn's session at the Brooklyn College conference, illustrated the changing emphases in mathematics courses for preservice and new teachers. Each of these presentations focused on the teaching of mathematics through hands-on and problem solving activities.

   Many of the workshops presented ways in which technology increases the scope of our classrooms and facilitate the teaching of mathematics and science. The College Of Staten Island Workshop and the New York University Conference both provided excellent examples of ways in which technology, including Internet access, may be used to enhance instruction.

2. Developing new courses and programs: Many of the workshop sessions presented courses which have been restructured in line with the new Collaborative goals but prior to the establishment of the collaborative. For example, the City College of New York faculty workshop focused on different courses that have been revised on various campuses within the Collaborative. The workshop sessions provided participants with models for future revisions.

   The New York University conference on technology and teaching and the College Of Staten Island faculty workshop provided ample illustrations of the potential for developing new courses including technology and the internet.

3. Developing new curriculum materials: The faculty workshops and conferences provided many examples of efforts to develop new materials through the use of technology and hands-on or inquiry-based activities. The individual sessions illustrated the collaboration of individual members of a single department on a participating campus and the cooperation between Liberal Arts and Education faculty.

   One session at the Lehman College workshop illustrated the collaboration between college faculty and NYC Public School personnel to restructure a science course for preservice and new inservice teachers. Through joint efforts, a summer professional development institute has been established to teach teachers science content they need to teach in the elementary and middle schools.

4. Providing student support and career development: A salient concern at the first faculty workshop, held at the Graduate School and University Center of the City University of New York, was the difficulty in supporting the efforts of mathematics and science majors in becoming a teacher. Many obstacles to securing employment were discussed in the Secondary Education Discussion Group. Many of the workshop sessions provided examples of significant ways to support students and facilitate career development toward teaching.

   At the College Of Staten Island workshop, a program that provides students the opportunity to work as interns in the public schools was presented. Similarly, the summer institute at Lehman College is an example of support for preservice as well as new inservice teachers. The institute provides a means for teachers to learn science topics they need in a way which supports their own teaching practices.

5. Recruiting promising students into teaching: Sessions at several of the meetings provided evidence of the Collaborative's present efforts to recruit students into teaching.

   At the College Of Staten Island workshop, two sessions involved programs which are potential avenues for recruiting teachers. First, the Chemistry Department's program of interns exposes young students to the teaching profession and college faculty. Second, an interactive mathematics session was facilitated by math students who serve as assistants in the computer lab component of the course. Former students guide present students through the computer activities using MATHMOL, a computer software package. Similarly, at City College of New York the project Workshop Physics was presented. This program illustrates a significant revision to a traditional Chemistry course which hinges on the involvement of former students from the course as group leaders.

6. Developing exemplary field sites for student teachers: Collaboration between the NYC Public Schools and individual campuses was demonstrated through several workshop sessions.

C. Summary of Suggestions and Comments.

The suggestions for future workshops are listed below. The statements made by the participants' in their feedback to the evaluators reflect the general need for practical workshops the content of which may be readily used in their attempts to revise their own practice. Workshops that presented hands-on experiences were received most favorably. Many of these sessions provided the participants with ideas they felt they could implement in their own classrooms. Another general suggestion relates to the framework of the sessions. Many individuals requested smaller, more concentrated group discussions of issues related to course revisions.

Specifically, the suggestions for future workshops include the following:

1. Strategies for college faculty to change instruction to a more inquiry-based or problem-solving model.
2. How does technology facilitate student learning? How might technology be used within the K-12 classrooms? These questions reflect the practical concerns of Public School teachers who attended the New York University conference on "Teaching and Technology."
3. Workshop sessions which are more closely matched to the needs and prior experience of the audience. Again, this reflects the needs of various participants who felt that they did not have the necessary technological knowledge to follow some of the sessions.

4. Workshop sessions that allow for ample time to interact with materials and computer software including the Internet.
5. Follow-up sessions related to specific ongoing projects within the collaborative.
6. Greater facilitation of the collaborative process between and within campuses through joint presentations. Alternatively, participants might bring their own materials related to the discussion of the session so that feedback and guidance may be possible.
7. Joint workshops with the NYC Public School personnel to investigate commonalities and connections between higher education faculty and public school teachers. These sessions may heighten the awareness of the college faculty regarding the realities of education in the NYC Public Schools.
8. Workshop sessions related specifically to course revision activities of collaborative members on various campuses. These sessions should include in-depth discussions of actual course examples including student work and provide ample opportunity for question and answer sessions.
9. Smaller focused discussion groups related to common concerns of collaborative members.
10. Presentation of data reflecting the impact of the collaborative on student attitudes and understanding after taking a revised course.

Year Two Report -- March 1997

There are two areas of evaluation activities in progress:

1. Formative, ongoing evaluation information to assist in project monitoring and provide technical assistance (A and B below);
2. Summative, project documentation and impact indicators (C and D below).

A. Formative Evaluation: Consultation and Technical Assistance.

The discussion of the National Visiting Committee from NSF in November 1996 emphasized both specific and broad goals for the collaborative:

- Explicit NYCETP goals applied to teaching and learning/curriculum;
- Evidence of effectiveness, assessment data;
- Institutionalization of curriculum and activities; and
- Overall teacher education program change based on common goals.

The formative evaluation report is based on on-going attendance of meetings of NYCETP Principal Investigators and Advisory Boards, observing and providing immediate comments as appropriate. Comments focus on discrepancies between Collaborative goals and implementation of particular activities, and the goals as emphasized by the NSF National Visiting Committee.

Forms have been developed to support collection of documentation of NYCETP activities within and between campuses (Appendix A). The case studies (described below and see Appendix B) provided information related to the status of NYCETP goals and progress. Follow-up interviews with faculty involved in the case studies provided feedback information to PIs that resulted in two concrete suggestions: (1) to focus on developing course material guidelines for course developers; and (2) to develop procedures to monitor course implementation with other than the original course developer, as aspects of quality control of NYCETP goals.

B. Formative Feedback on Collaborative Workshops and Conferences.

The workshops have served several Collaborative goals, including providing opportunities for meeting other faculty, both within and across campuses and disciplines. Working groups are forming with interests in mathematics education at the K-8 level, science education at the elementary level, and a secondary group combining interests in these areas and student recruitment. Each group includes both liberal arts and science faculty and education faculty.

As noted in the 1995 annual report, there remains a problem of consistent faculty involvement and communication, within and across campuses, particularly around collaborative/national reform goals. Implementation of a Collaborative Website by New York University in winter 1997 is likely to facilitate communication for these groups. Also, as of February 1997 these groups have started to meet as working groups, focused on sharing particular curriculum developments.

C. Case Studies: Baseline Documentation of Curriculum.

Development of plans and procedures for cross-campus case studies of courses being revised/developed by NYCETP culminated in the development of a Case Study Outline (Appendix B). The case studies have served several NYCETP project goals, as well formative evaluation and summative baseline documentation information, encouraging cross-campus collaboration for the case studies. Collection of baseline documentation of courses being revised or developed was started in the spring of 1996 and focused primarily on faculty revising mathematics and mathematics education courses. This curriculum documentation will be expanded in spring 1997, focusing on the sciences. These are cross-campus case studies conducted by NYCETP faculty revising courses.

Participating case study faculty replied to a follow-up survey. They indicate the following: (1) The format of the case study outline was useful; and (2) Needed additions to the outline include evidence of ongoing evaluation during course development, goals for new courses and evidence of outcomes, and greater detail on student preparation. Informal comments indicate the case study process has fostered communication across campuses in the main area of focus, mathematics.

Changes in faculty thinking as a result of participating in a case study were described. Specific statements indicated that the faculty members were considering the following: (1) planning to incorporate more computer graphics and simulations in (chemistry) course; (2) focusing on course preparation and entrance requirements (Elementary Mathematics); (3) increasing student collaborative work and manipulative workshops (Mathematics for elementary education students); and (4) the need to rewrite math and math education courses and sequencing to increase integration.

Outcomes of the interviews was used to revise the Case Study Outline and the information was also useful in defining what materials are needed long-term for new/revised course dissemination.

Follow-up case studies are planned for spring semester 1997. Faculty doing case studies will have a revised outline, including designation of specific documentation and observations. PIs have been asked to identify courses and faculty to participate

in case study documentation in spring 1997. Case study writing will occur again during the summer.

D. Assessment Projects.

Two small scale assessment projects have been conducted: (1) 1995-1996 PI faculty survey of views about teaching and learning mathematics and science, analysis of faculty responses; and (2) City College mathematics attitude survey. A City College faculty member is concerned with changing student attitudes toward mathematics and conducting a pre-/post-course survey of student attitudes (adaptation of the Fennema-Sherman Mathematics Attitude Scales). Scale and item analyses have been carried out by evaluators on the data from three course sections (one being revised, two not revised) of Math 185, Fall 1996 (Mathematics for K-6 Teacher Education Students). The data indicated satisfactory reliability coefficients and no significant differences between groups in initial and end of course attitudes. There was a trend toward a decrease in anxiety for the revised course students. The numbers of students who participated in the survey are very small, and the scales are being administered again in spring 1997.

Overall, for NYCETP, three aspects of assessment of teacher education students continue to be discussed (see below). The methodology or design for examining student assessment results is indicated for each aspect. There is a great diversity of courses being revised/developed. Therefore, the most recent student assessment suggestions center first, on long-range outcome assessments for graduates of the Collaborative programs, and second, on outcome assessments for students in individual courses or clusters of highly similar courses.

1. Collaborative and program-level assessment and evaluation. The long-range outcome measures that are most feasible are the New York State examinations used for provisional certification and permanent certification of teachers. These include general liberal arts measures (e.g., mathematics, writing) and core subject matter measures (e.g., science, language arts, and for high school, chemistry, mathematics, physics, biology). The final stage of the certification process, permanent certification, requires submission of a videotaped sample of teaching performance, usually after a minimum of two years of teaching (effective September 2, 1993, NYSED, Office of Teaching, Albany, NY, Rv 7/96, NY.IG-AT5000.01.96, NES; Performance Video Information Guide 1996-7). The procedures require a minimum of 10 minutes of non-whole group instruction and evidence of "integrated instructional strategies that promote active student learning."

   As of Fall 1996, these assessments are required for certification of all new teachers in the state. The resulting scores for the general liberal arts

measures are now available to individual colleges for all of their graduates who sit for these examinations. Colleges will check and disaggregate data as needed to include only examinees that have taken liberal arts and teacher preparation courses at their respective colleges.

Beginning fall 1996, and annually thereafter, data can be provided to the Collaborative by each college for each area of teacher education (i.e., Elementary, 7-12 Subject Area Majors). The first sets of data from fall 1996 have been received (winter 1997) and Collaborative colleges are now checking data to identify students who took their course work at the respective college, and who can be identified as "program graduates." The NYS tests are being examined in detail for the tasks and skills required for particular items.

Descriptive information on the Assessment of Teaching Skills-Performance will be circulated to NYCETP faculty for their information and discussion of the potential usefulness of videotaping assessments within the Collaborative.

2. Course-specific assessment. Documenting change in student beliefs, attitudes, and conceptual understandings can best be approached course-by-course. The assessment workshop at City College (11/1/96 Lemons & Griswold, Department of Biology, City College) provided one concrete example of the type of course materials and assessments that might be developed for individual courses. These materials and assessments permit individual faculty to document, and to persuade others, that change has taken place, as well as to establish the exact nature of changes. The documentation would constitute a "legal brief" to argue the case that desired student change and outcomes have been obtained through student participation in a specific revised or newly developed course.

   The use of course-specific assessment may also require review panels to determine the extent to which the documentation is persuasive. If course specific assessment is adopted by the Collaborative, the project will need to develop a set of procedures, identify acceptable types of evidence for documentation of course effectiveness, and define how panels of peer reviewers (e.g., faculty, master teachers) would be constituted.

   The design for student assessment data collection would include:

   a. New Courses: pretest/posttest on "outcome measures," on preliminary and then finalized courses. In some instances, pretests may take the form of diagnostic assessments. In all instances, it is expected that

there would be during- course assessments and documentation of (some) learning activities.

b. Revised Courses: baseline data as soon as possible on course "outcome measures." Pretest/posttest on revisions and final version of course. (Same comments as above for during-course assessments and documentation of learning activities.).

Discussion of assessment and course goals will be initiated based on the NISE (National Institute for Science Education) brief on "Determining alignment of expectations and assessments in mathematics and science education" (N.L. Webb, U. Wisconsin-Madison, Vol. 1, No. 2, January 1997).

3. Views about Sciences Survey (VASS)

External evaluators for the NYCETP, M.K.Stout and C.Krop of ETI (Evaluation and Training Institute), met with NYCETP PIs and evaluators on October 22, 1996. As a result of the meeting, they provided copies of an instrument developed at Arizona State University: Views About Sciences Survey (VASS) (Halloun, & Hestenes, 1996, NARST Annual Meeting, April 1, 1996, St. Louis, Missouri).

This survey is available in four forms (Biology, Chemistry, Mathematics, and Physics), 33 items in each. Items are focused on the respondent's beliefs about science and mathematics on four epistemological dimensions (structure and validity of scientific knowledge, scientific methodology, and role of mathematics in science), and three pedagogical dimensions (learnability of science, critical thinking and personal relevance of science). Students also answer questions on their competence in the science/ mathematics field, expectations for the course, and estimates of actual achievement in academic tasks for the course to date (15 to 24 additional questions per form).

The VASS is being administered to small samples on a volunteer basis during spring 1997. The answer sheets are being returned to ASU for scoring and the evaluators are summarizing student responses to a questionnaire (about taking the VASS) administered after they completed either the Chemistry or Mathematics VASS.

E. 1996-7 Evaluation Plan Timeline

November/December	Case study interviews Posttest survey administration City C. Data analysis for City College attitude measure--pretest Continue discussion re: use of VASS
January/February	Data analysis, City C. posttest Analyze case study follow-up interviews Revise case study outlines/procedures Literature search: review panels curriculum/course documentation Pilot administration of VASS one science area, 1 course section include questionnaire for students on format--small N
March-April	Contact faculty for case studies Meet/phone contacts case study faculty Summarize literature on review panels and on curriculum/course documentation
May- June – July	VASS post course administration, May VASS data analysis Case study summaries Develop draft review panel procedures

Continuing activities: observe/document workshops, conferences, working group meetings.

Appendix A

NYCETP - Categories of Activities on Individual Campuses Cross Referenced with Applicable Contact Groups: Please consider the following categories of activities and associate groups of individuals as a reminder of Collaborative goals, objectives and needed "critical incidents" documentation. Please provide the following identification information. Following this information, indicate which activities you are involved in referencing the particular target group(s) highlighted along the top of the table. Please attach any and all supporting documentation (e.g., syllabus)

Name : _____

School: _____

Department : _____

Title/Position : _____

Category of Activity/Targeted Contact Group	inter-campus	intra-campus	Mt/Sci faculty	Educ Faculty	Master Teacher	Curr-iculum	Educ Student	Liberal Arts Student	Mt/Sci Distr Coor
1. Develop new approaches to:									
A. Teaching Mathematics/Science									
B. Assessing Mathematics/Science									
2. Provide new training opportunities									
A. New courses for preservice/inservice teachers - Mathematics/Science									
B. Continuing Education/Workshops									
3. Develop new training materials									
A. Design curricular materials reflecting collaboration among faculty of varied disciplines and school teachers									
B. Design curricular materials reflecting urban context									
4. Provide student support and career development									
A. Internships for preservice students									
B. Follow-up of first year teachers									
5. Recruitment									
A. Mathematics/Science majors									
6. Develop exemplary field sites									
A. Preservice observation sites									
B. Cooperating teachers									

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7. Links to other Systemic Projects									
A. Collaboration with USI/SSI									
B. Collaboration with local school districts									
8. Placement Strategies									
A. Networking with local school distr.									
9. Other Activities									
Include description/materials									

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Appendix B

NYCETP Case Study Outline

Begin the case study with an introductory page that describes the special characteristics of this course relative to the NYCETP collaborative goals:

- Increased use of inquiry-based approaches.
- Opportunities for hands-on, experiential learning.
- Focus on deep understanding of major concepts.
- Increased use of technology in effective ways.
- Use of an "urban context."
- Incorporation of alternative assessment approaches.
- Partnership of science/mathematics faculty and education faculty.
- Partnership of science/mathematics faculty and K-12 teachers.

Use the following outline to guide your documentation of the Collaborative course. The goal of providing this outline is to attain similarity between the case studies on different campuses. Please use the categories and questions to guide your interviewing and writing. Collect all materials that are available for the course and that may be included to illustrate your case descriptions.

I. General Overview and Context:

1. Instructor's name, department, title/position, course relevant experience/education, years teaching this course.
2. Title of course, number of hours and credits.
3. Catalogue description, placement of course in sequence, required core courses or other prerequisites, required course or elective.
4. Typical number of sections offered per semester, description of faculty who teach sections other than interviewee (i.e., number and percentage full-time versus adjunct or part-time faculty, pertinent experience, etc.).
5. Entering requirements such as grade point average or score on a diagnostic assessment.
6. Organization or breakdown of hours for each class session or hours per week (i.e., lecture, recitation, and lab hours).
7. Brief description of institution, total enrollment size, characteristics of student body.

8. Brief history of course, evolution of course over time (prior to NYCETP revisions) and broad goals or circumstances for changes.

II. Students - Target Population:

1. Course enrollment size, intended population (level of students, i.e., first year, major, teacher education student, etc.),
2. Description of several "typical" students (i.e., age, gender, ethnicity, SES, background, likely career goals or major).

III. Course Revisions or Development as Part of NYCETP Activities:

1. Name(s) of college faculty who revised/developed the course as part of NYCETP efforts. Others who have helped planning or revising course(s)? Did members of the Liberal Arts faculty and the Education faculty collaborate on the revision or development of the course (describe collaborative efforts)?
2. Overview of new or revised course including characteristics specifically related to particular NYCETP goals.
3. When was the new or revised course offered for the first time (or when will it be offered)? Will it be offered again? When?
4. Differences between new/revised course and the course that was originally offered (e.g., how has course structure or allocation of class time changed; how are goals and expected outcomes different, etc.).
5. Does this course involve the collaboration of experienced or master teachers, school district coordinators or others? Are exemplary field sites (i.e., classroom observation or student-teaching sites) being developed in conjunction with the new or revised course? Describe the use of such sites.
6. How is the impact of revisions on prospective teachers being evaluated? Have additional revisions been planned as a result of such an evaluation of the revised course?
7. Plans for revision not yet implemented or fully developed. Do these plans include provisions for the recruitment of teachers?
8. How has revising or developing the course changed your (i.e., the faculty who revised the course) thinking related to learning and teaching?

IV. New/Revised course specifications:

1. Course objectives.
2. Statement of course philosophy. Statement of goals for revision or development of the course.
3. Syllabus including a listing of the focus for each session of the course, sequence of topics, corresponding materials/resources, readings, other assignments or assessments, references, etc.
4. Full reference for required text.
5. List of specific activities and major investigations that will be used for a given session/topic. How do these activities reflect the goals and objectives of the course? How will they strengthen student understandings? How do they reflect the processes within the domain (i.e., math or science)? How might they be adapted by the student to use in his or her own (future) teaching?
6. Predominant instructional modes/methods - detailed description of a "typical" class session, pedagogical approach taken (e.g., lecture, demonstration, experimentation or inquiry, recitation/drill, group work, independent work, peer tutoring, etc.); what teacher and students were doing throughout the class. Give examples of sample oral questions the instructor used to assess student understanding.
7. Statement of justification or criteria for course objectives, topics, sequence of topics, activities, assignments, instructional practices, etc. (i.e., pedagogically meaningful?).
8. Evidence of cross-disciplinary or cross-campus collaboration. Does the course reflect the integration of mathematics, science and technology? How is this integration achieved?
9. How does this course reflect the integration of teacher preparation goals and/or theories of learning and instruction within the domain (i.e., math or science)?
10. Physical facilities (i.e., laboratory, computers, etc.), description of typical classroom and supporting equipment (i.e., computers, video equipment, VCR and television, etc.). How frequently do students use facilities other than the assigned classroom?

V. Student Outcomes and Assessments:

1. Describe assessment and evaluation practices. What types of assessments are used (i.e., multiple choice, open-ended questions, etc.). **Collect and include examples of tests or other forms of assessment as well as examples of student responses.** Include evaluation/scoring guide: What does the instructor look for in evaluating these examples?
2. How does this form of assessment provide evidence of course goal attainment?
3. Justification and/or criteria for the use of particular forms of assessments.
4. Overall, what impact do you think this class will have or has had on students as prospective teachers (e.g., student knowledge, understanding, and attitudes toward the subject matter)? Please provide specific examples or anecdotes to illustrate these impacts.

VI. Faculty Roles:

1. How do you view your role as an instructor in relation to student learning and outcomes in this course?
2. How do you view mathematics (or science) as a discipline?
3. How do you view science (or mathematics) education as a discipline?
4. What do you see as your role in the preparation of prospective teachers?